Multifunctional Composite Materials, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

Polymeric composite materials that are currently utilized in aircraft structures are susceptible to significant damage from lightning strikes. Enhanced electrical and thermal conductivity in these polymeric composites could eliminate this damage. The addition of this multifunctional capability to composites will result in lower manufacturing costs and weight reductions in future aircraft since the addition of coatings, conductive mesh, or expanded foil materials can be eliminated. A combined materials and engineering approach will be utilized to accomplish this objective by modifying a high performance composite system with a combination of conductive nano and micron size filler materials. The large difference between the two filler sizes will create a stratified composite structure that consists of the conductive micron size particles residing in the interlayer region of the composite with the nanomaterials dispersed evenly throughout the matrix and in the fiber tows. Using this approach, these composites will have the same or better balance of mechanical properties as current state-of-the-art composite systems but also have the added functionality of a conductive interlayer and network to eliminate damage from lightning strikes. The Technology Readiness Level will be between 3 and 4 after the Phase 1 program.

Primary U.S. Work Locations and Key Partners

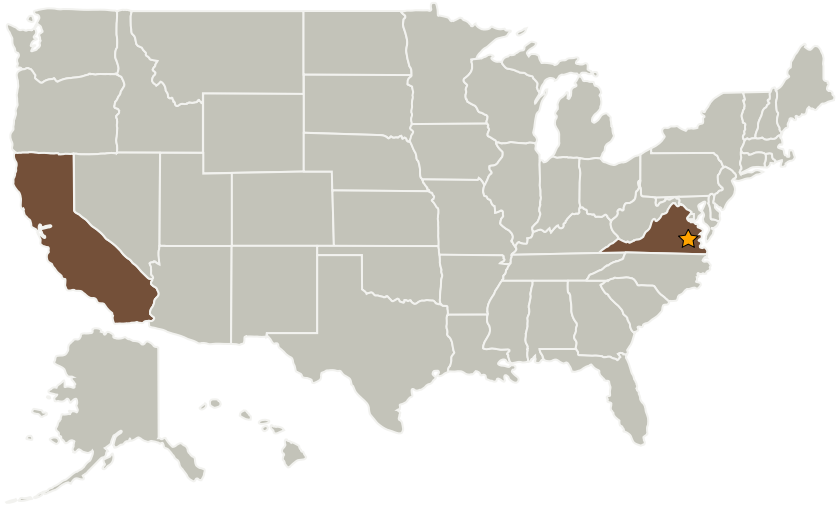

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Applied Poleramic, Inc.	Supporting Organization	Industry	Benicia, California

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials